OCTOBER UNIVERISTY
FOR MODERN SCIENCES AND ARTS
جامعة أكتوبر للعلوم الحديثة والآداب

Pharmacogno

PHG 112
PG 102

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Dr. Ibrahim Ezz

Spring 2023

Pharmacognosy

PHG 112
PG 102

Mission

- The Faculty of Pharmacy of October University for Modern Sciences and Arts is nationally accredited, has British partnership, and is committed to producing graduates who are able to compete in national and international job markets and entrepreneurship, and to be an effective member of the medical team providing best medical care, while heeding professional ethics, through an outstanding academic programme and proficient academic staff. The faculty is devoted also to provide effective community services, and exceptional applied scientific research.

الرسالة

- كلية الصيدلة جامعة أكتوبر للعلوم الحديثة والآداب معتمدة محليا، بشراكة بريطانية، تلتزم بتخريج صيدلى قادر على المنافسة فى أسواق العمل المحلية و الدولية و ريادة الأعمال، و أن يكون عضو فعال فى الفريق الطبى بتقديم أفضل رعاية صحية، مراعياً أخلاقيات المهنة، من خلال برنامج تعليمى متميز و أعضاء هيئة تدريس أكفاء، وكذلك تلتزم الكليه بقديم خدمات مجتمعية فعالة و أبحاث علمية تطبيقية متميزة.

Vision

- The Faculty of Pharmacy of October University for Modern Sciences and Arts is a pioneer in tutelage, scientific research, and community service at the local and regional levels, and holds an advanced position among its counterparts in international Pharmacy subject ranking.

الرؤية

- كلية الصيدلة جامعة اكتوبر للعلوم الحديثة و الآداب (MSA) كلية رائدة فى مجال التعليم و البحث العلمى و المشاركة المجتمعية على المستوى القومى و الإقليمى و لها ترتيب متقدم فى التصنيف العالمى لكليات الصيدلة.

AIM OF THE COURSE

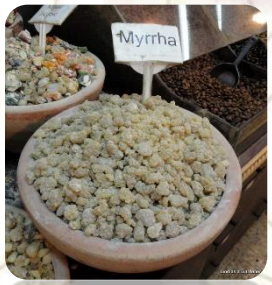
The course introduces the student to the knowledge and skills that enable him to differentiate between different organs of crude drugs through their monographs (seeds, fruits, herbs, subterranean organs, unorganized drugs in addition to drugs of marine and animal origin) , identifying their active constituents and adulterants, description of micro- and macro-morphological characteristics, benefits and precautions of their medicinal uses, side effects and contraindications and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

Weighting of assessments

Item	PG 102	PG112
Quizzes:	5 Marks	5 Marks
Assignments:	10 Marks	15 Marks
Practical Exam(s)	20 Marks	40 Marks
Mid Term Exam	15 Marks	30 Marks
Final Exam	35 Marks	60 Marks
Oral Exam	15 Marks	----------
TOTAL	100 Marks	150 Marks

Course Content

- Seeds
- Fruits
- Herbs
- Subterranean organs
- Unorganised drugs



REFERENCES

1. Trease& Evans' Pharmacognosy by William Charles Evans, 2002.
2. Botany : An introduction to Plant Biology, Third edditionby James D. Mauseth,2008
3. Fundamentals of Pharmacognosy and Phytotherapy by Michael Heinrich, Joanne Barnes, Simon Gibbons, and Elizabeth M. Williamson, 2004

Electronic Materials, Web Sites

http://www.hort.purdue.edu/newcrop/med-aro/default.html
http://www.herbmed.org/
http://www.danish-schnapps-recipes.com/plants.html
http://www.botanical.com/

Lecture 1

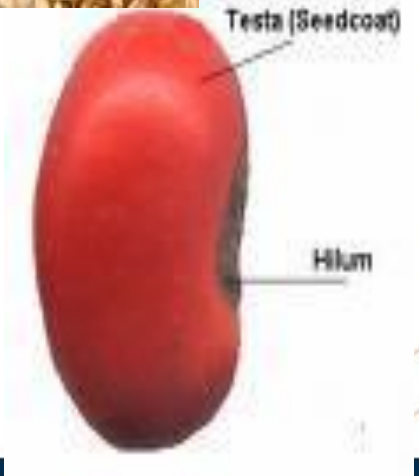
Interactive teaching methods & activities

https://www.youtube.com/watch?v=bUjVHUf4d1I

https://www.youtube.com/watch?v=74A4yVggSjY

Quizizz

Seeds



By the end of the lecture, students should be able to demonstrate knowledge of:

- **- Definition of seed & its function**
- **- Different types of seeds**
- **-Types of Ovules**
- **-The marks on seeds surface**
- **-The structure of the seed**
- **-The outgrowth of the seed's testa**
- **-The microscopical structure of the seed**

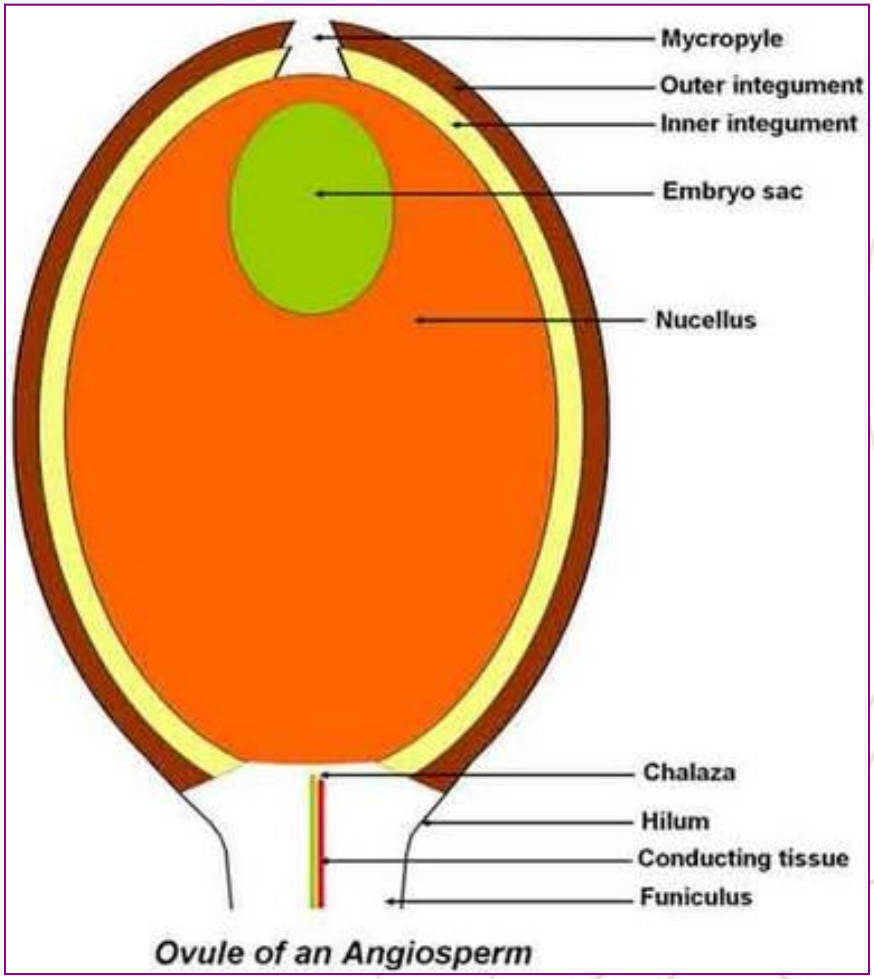
Definition:

- A seed is a highly specialized reproductive structure formed in flowering plants as a result of fertilization induced in a mature ovule
- In other words; it is a riped enlarged fertilized ovule.
- It is responsible for the continuation and propagation of the plant

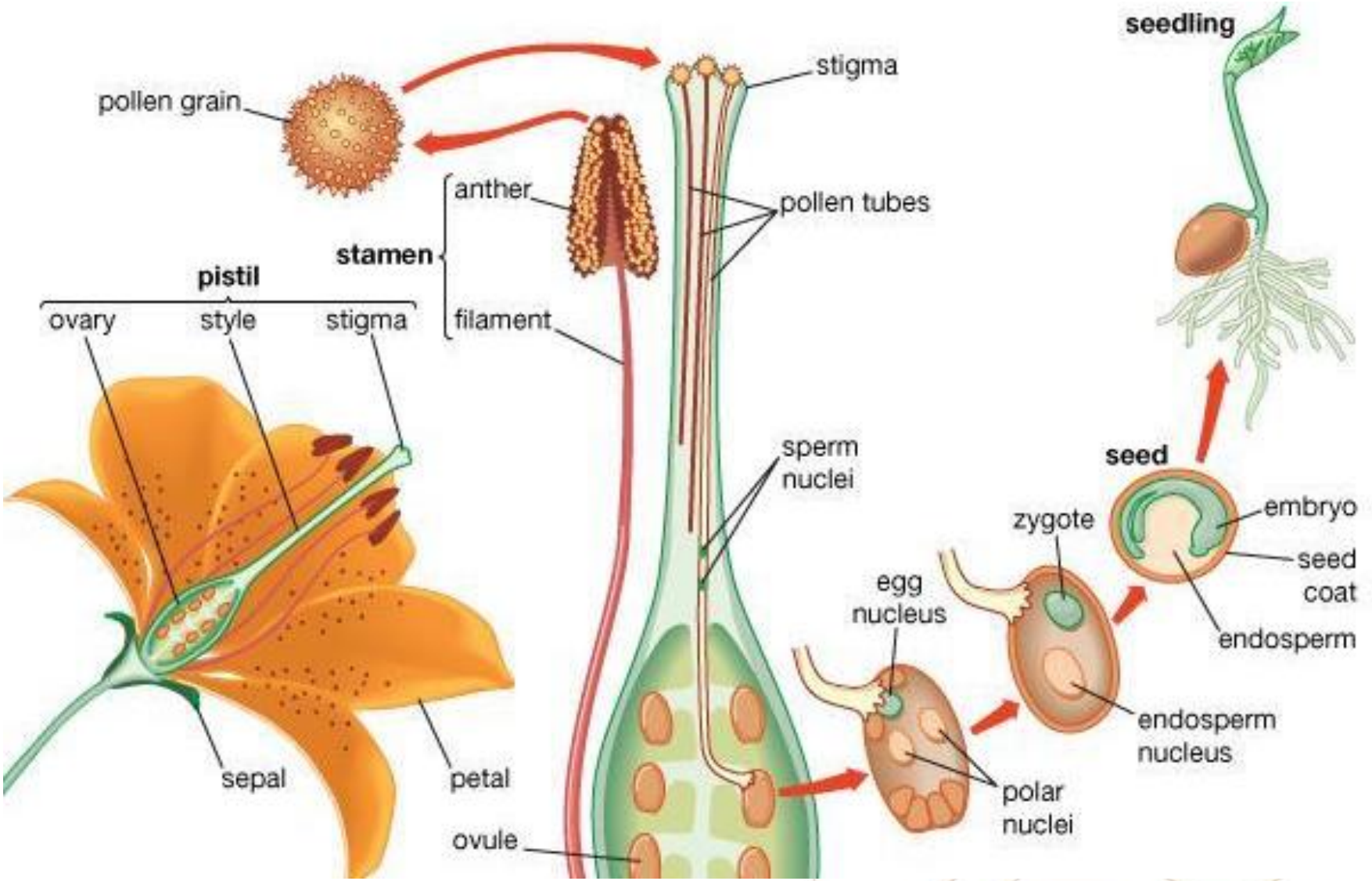
THE MATURE OVULE

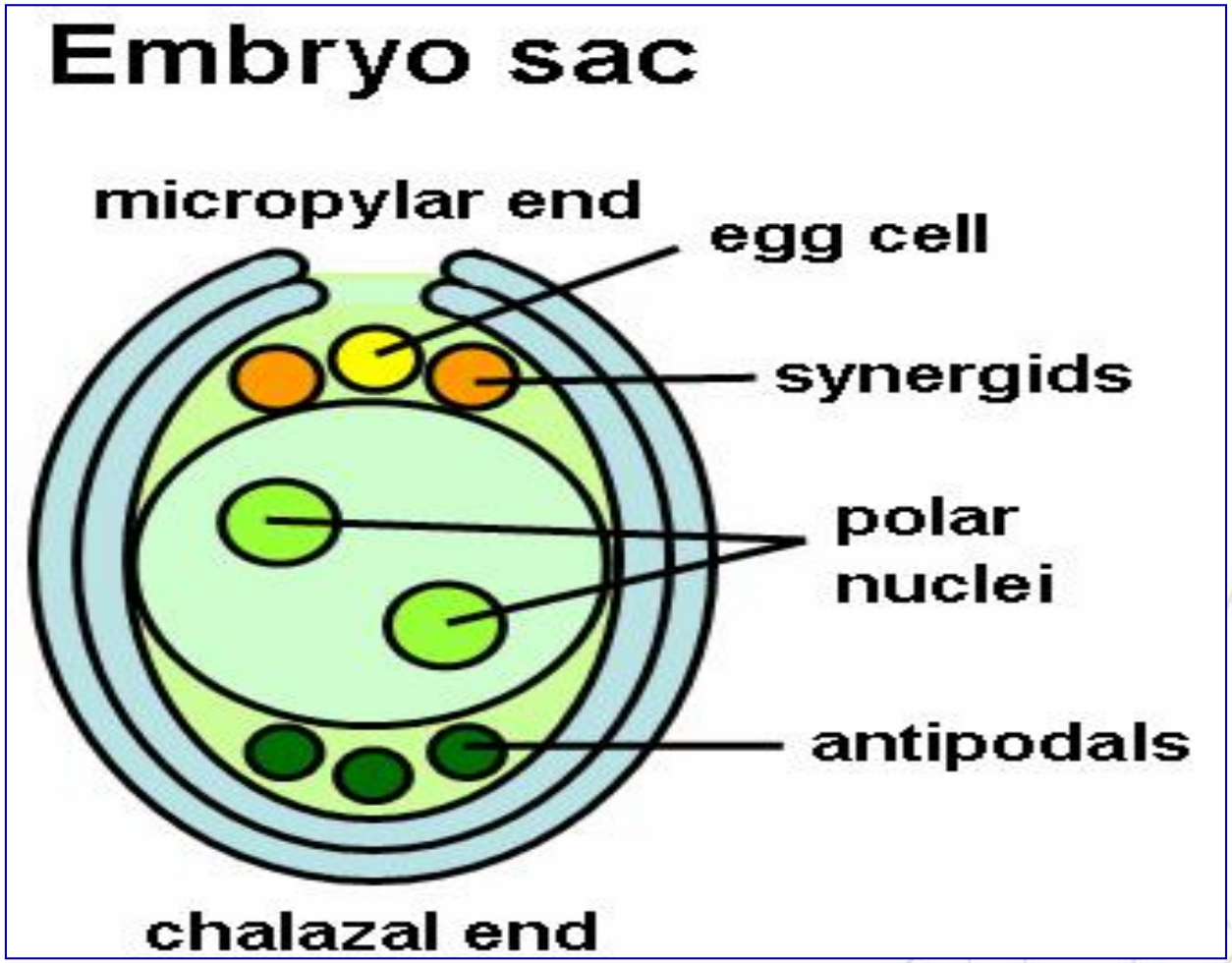
It consists of:

1- Nucellus.
2- Micropyle.
3- Integuments.
4- Embryo sac.



Seed formation:




Embryo sac
micropylar end
egg cell
synergids
polar
nuclei
antipodals
chalazal end

The mature ovule consists of

1-Nucellus

2-Embryo sac: contains eight or seven nuclei.

- Three nuclei forming the antipodal cells, at the farther end of the micropyle.
- Two, called polar nuclei, fused together to form primary endosperm nucleus
- Three naked nuclei at the micropyle end, forming the egg apparatus or zygote.

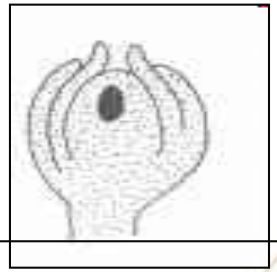
3- Funicle

4-Chalaza

TYPES OF OVULES

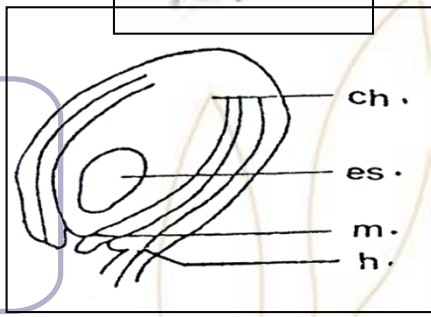
1- Orthotropous or atropous

- The ovule is straight having funicle, chalaza and micropyle on one straight line and the micropyle is lying at the extreme apex opposite the funicle or its scar.



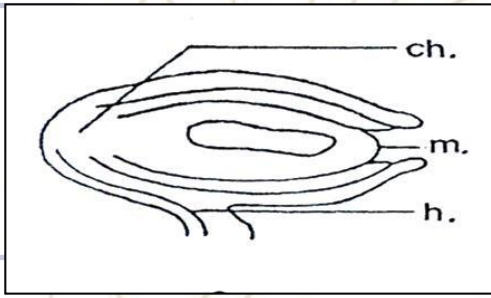
2- Anatropous

- The ovule is bent upon the funicle(180) and fused with it so that the micropyle is near the placenta and the raphe runs from one end to the other e.g. Linseed



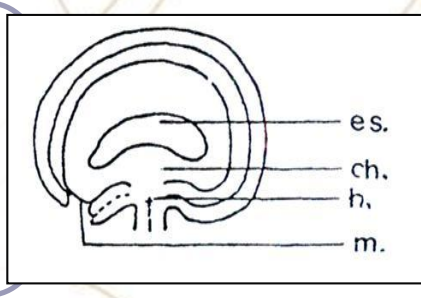
3- Amphitropous

- The body of the ovule is bent(90) so that the micropyle and chalaza are on a line at right angle to the free funicle or hilum e.g. Colchicum

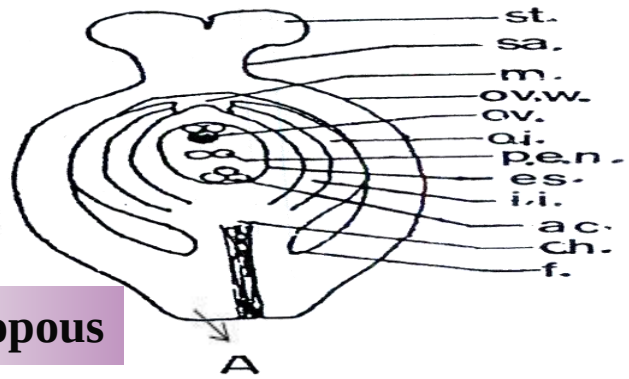


4- Campylotropous

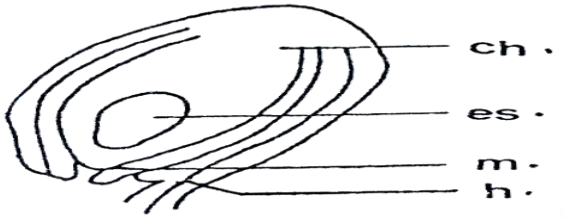
- The whole ovule is bent upon itself instead of upon the funicle so that the funicle, chalaza and micropyle are all close to one another and no raphe is present e.g.Mustard seed



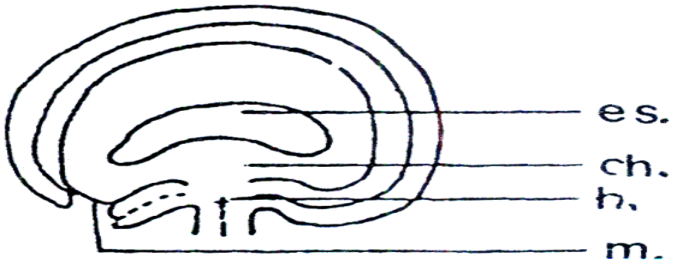
Types of ovules
St., stigma; sa., style; m., micropyle; ov.w., ovary wall; ov.; ovule; o.i, outer integument; i.i., inner integument, p.e.n., primary endosperm nucleus; e.s., embryo sac; a.c., antipodal cells, ch., chalaza; f., funicle.



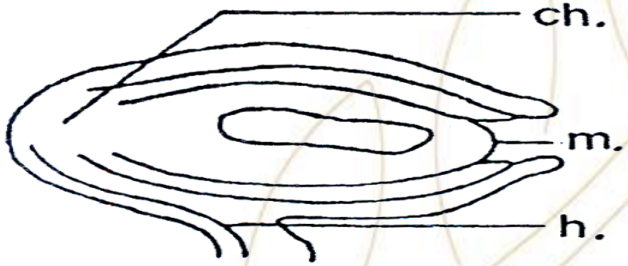
Atropous



Anatropous



Campylotropous



Amphitropous

THE TESTA SHOWS ON ITS OUTER SURFACE CERTAIN MARKINGS

- **The hilum**: It is the scar left by the removal of the seed from its funicle or stalk
- **The microphyle** : It results because the coats at the apex not quite complete leaving such a scar
- **The chalaza:** The basal swollen part of the nucellus from which arise the integuments& where the vascular strand from the funicle branches to enter different parts of ovule
- **The raphe** :Arises from fusion between the funicle with the integument It is present in anatropous ovule e.g. Linseed and amphitropous ovule e.g. Colchicum

A TYPICAL SEED CONSISTS OF

1- Testa formed of one or two seed coats originated from the integuments of the ovule.

2- Perisperm formed from the nucelleus

3- Endosperm surrounding the embryo and developed from the primary endosperm nucleus of the embryo sac

4- An embryo developed from the fertilized ovum

a-Cotyledons: one or two which store food for growth

b- Plumule: It is the stem growing point

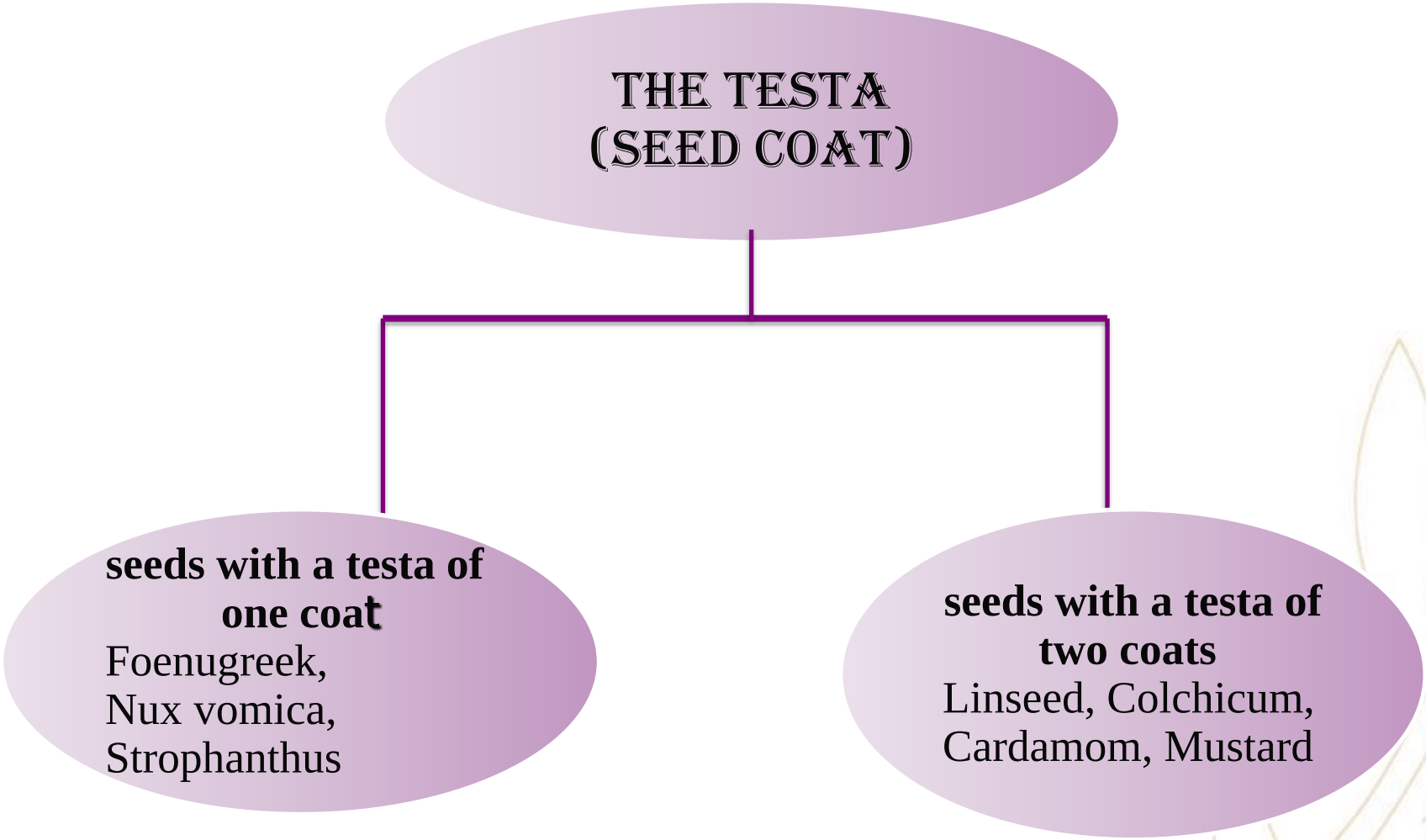
c) Radicle: It forms the root system

The Kernel: the structure of the seed enclosed within the testa

KINDS OF SEEDS

Albuminous seed:
a-The **embryo** is surrounded by the **endosperm** e.g. Linseed**.**
b-The **embryo** is surrounded by the **endosperm** and **perisperm** e.g. Cardamom

Exalbuminous seed:
the **embryo** alone exists within the testa
e.g. Mustard


THE TESTA
(SEED COAT)
seeds with a testa of one coat
Foenugreek,
Nux vomica,
Strophanthus
seeds with a testa of two coats
Linseed, Colchicum,
Cardamom, Mustard

The testa differs in texture and thickness:

1- Membranous as in peanut

2- Leathery as in foenugreek

3-Hard as in castor seeds

OUTGROWTH OF THE TESTA

During the formation of certain seeds from the ovule arise additional growths outside the integument or developed from the integuments

- Different names are given to these outgrowths according to their origin and nature

OUTGROWTH OF THE TESTA

1- Arillus

arises from the funicle or the tissue of hilum e.g. Cardamom

2-Arillode

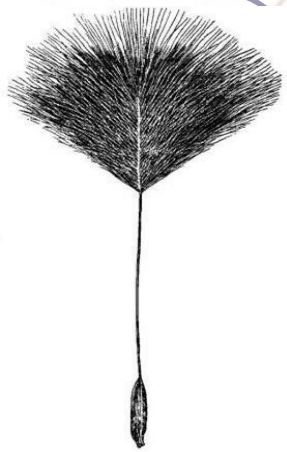
arises from the tissue of micropyle e.g. Nutmeg

3- Strophiole

local enlargement along the line of the raphe e.g. Colchicum seed

4- Wing

Awn e.g. Strophanthus



MICROSCOPICAL CHARACTERS

A- Testa
- Epidermis
- Hypodermis,
-Pigment layer,
-Sclerenchyma,
- Nutritive layer

B-Kernel
- Perisperm
- Endosperm
- Embryo

C-Reserve Food Materials
(Cell Content)

(A)TESTA:

- **Epidermis**
- **Hypodermis**
- **Pigment layer**
- **Sclerenchyma**
- **Nutritive layer**

B- THE KERNEL

the structure of the seed enclosed within the testa

- THE PERISPERM may be large or membranous coat or hardly distinct

- Large containing starch *e.g.* Cardamom

- Small *e.g.* Ricinous

- Infolding penetrating the endosperm *e.g.* Nutmeg

↘

-THE ENDOSPERM may be <u>starchy</u> *e.g.* F. Graminae, <u>oily</u> *e.g.* Anise or having <u>hemicellulosic walls</u> *e.g.* Colchicum and Nux vomica

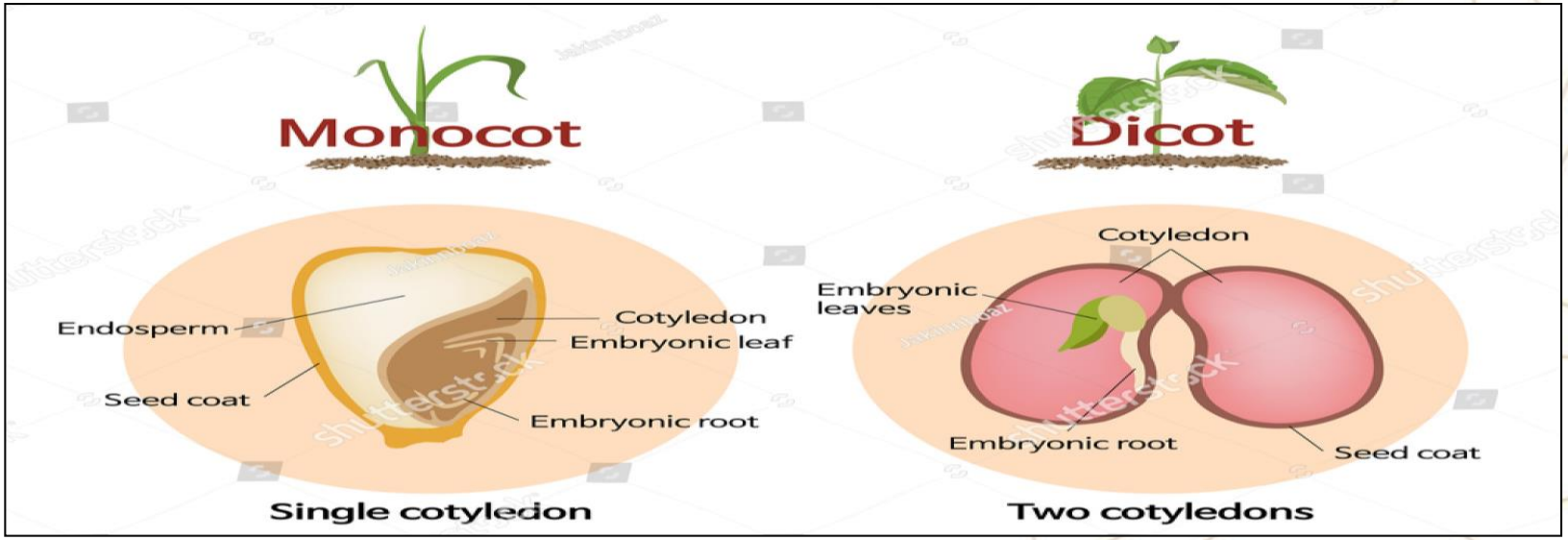
THE EMBRYO

consists of -

a) one cotyledon (monocotyledon) or two cotyledons (dicotyledons) or more -

b) Plumule: It is the stem growing point

c) Radicle: It forms the root system



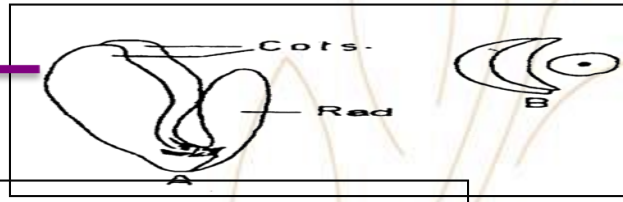
TYPES OF EMBRYO

1- Straight

e.g. Linseed

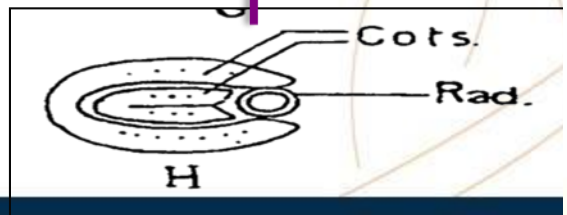
2- Bent on itself

a) Incumbent

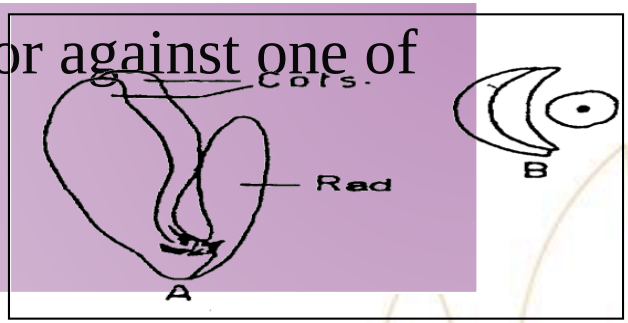


b) Accumbent

c) Orthoplocus



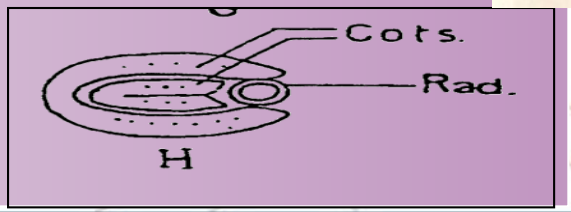
a) **Incumbent:** The radicle may be bent over or against one of the straight cotyledons e.g. Cannabis



b**) Accumbent:** The radicle may be bent against the two straight cotyledons i.e. against their edges

e.g. Foenugreek

c) **Orthoplocus:** It is an incumbent embryo with the cotyledons folded along their midribs so as to enclose the bent radicle e.g. Black mustard



C-RESERVE FOOD MATERIALS

Starch: It gives blue colour with <u>iodine</u>
e.g. Wheat, Maize & Cardamom

Protein
- Amorphous mass e.g. Cardamom
- Aleurone grains in ripe seeds e.g. Leguminoseae

It gives red colour with <u>Millon's</u> reagent and yellow ppt with <u>picric acid</u>

Fixed oil and fat
It gives red colour with <u>sudan III</u>

Ca Ox Crystals

SEEDS OF MEDICINAL IMPORTANCE

According to the constituents)

Fixed oil

Linseed
Fenugreek
Black Mustard
White mustard
Nutmeg
Nigella
Castor seed

Glycosides

Linseed
Fenugreek
Mustard Seeds
Strophanthus
Nigella
Bitter almond

Volatile oil

Nutmeg

Cardamom

Nigella

Mucilage

Linseed
Fenugreek
Mustard seeds
Psyllium

Alkaloids

Nux vomica

Colchicum

Coffee beans

Stramonium seeds

Physostigma seed

Quizizz

Home work

- 1- Enumerate the types of ovules
- 2- Enumerate scars on the surface of the seed
- 3- Enumerate outgrowth on the surface of the testa giving examples
- 4- Enumerate different types of embryo giving examples
- 5-What is meant by: albuminous seed, exalbuminous seed, kernel

Faculty of **Pharmacy**

MSA
UNIVERSITY
IN EGYPT SINCE 1996
Established by Dr.Nawal El Degwi
October Univeristy for Modern Sciences and Arts
جامعة أكتوبر للعلوم الحديثة والآداب

Thank You!

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